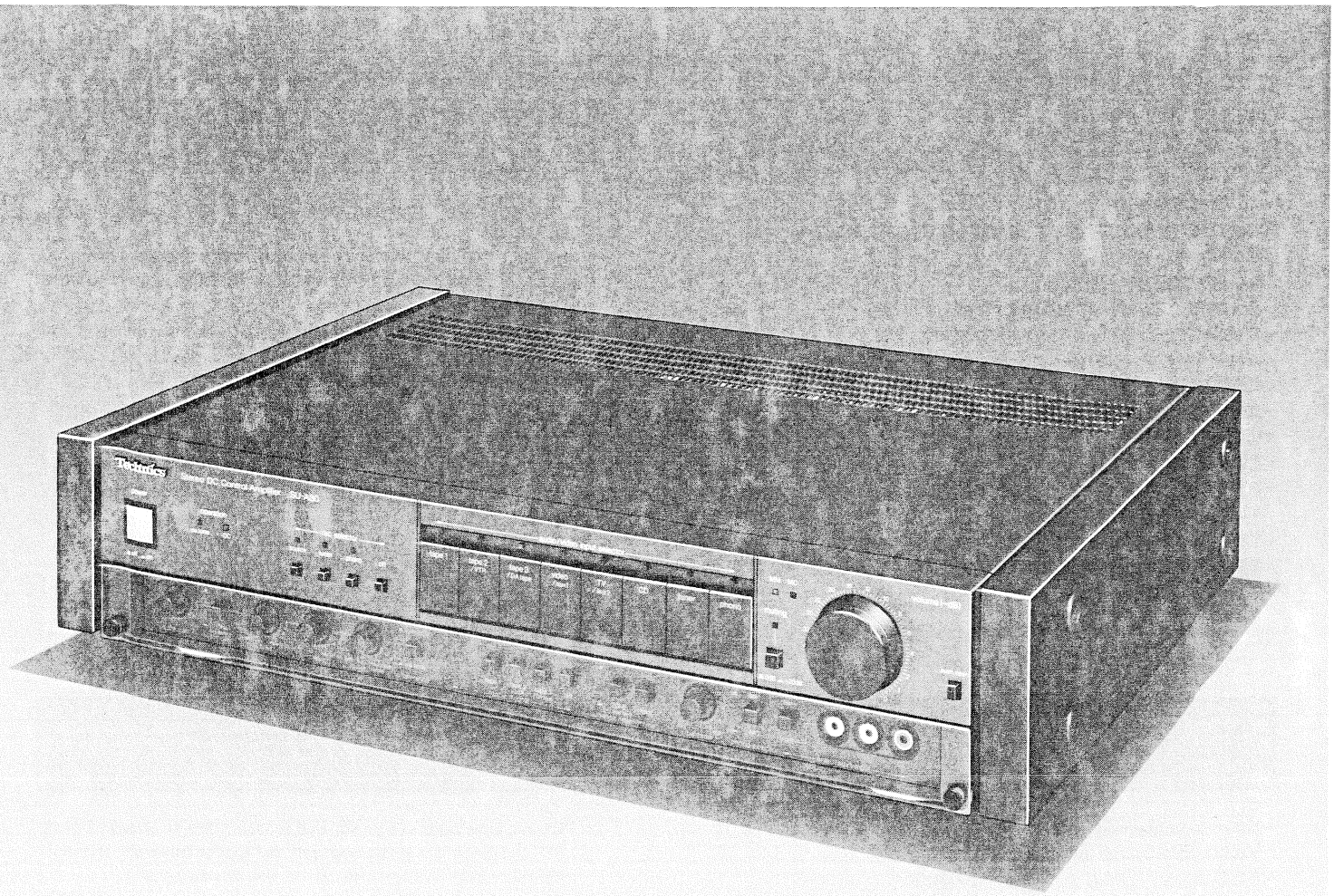
Technics

Stereo DC Control Amplifier

SU-A80

OPERATING INSTRUCTIONS

Before operating this unit, please read these instructions completely.



Dear Stereo Fan

Thank you for selecting the Technics model SU-A80 stereo DC control amplifier.
This unit is the product of long experience and concentrated efforts of our engineering staff. It is the successful result of our continuous and thorough research efforts directed toward even better performance.
In order to obtain the finest performance of which this unit is capable and to get the longest possible performance satisfaction, we recommend that you carefully read these operating instructions before using the unit, and that you always operate the unit correctly.

The model number and serial number of this product can be found either on the back or bottom of the unit.
Please note them in the space provided below and retain this booklet as a permanent record of your purchase to aid identification in the event of theft.

MODEL NUMBER _____ SERIAL NUMBER _____

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

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ACCESSORIES

- Stereo connection cable 1
- Video connection pin cord 1
- BNC (male) - RCA pin (female) adaptor 1
- BNC (female) - RCA pin (male) adaptors 4

MAINTENANCE OF EXTERNAL SURFACES

To clean, use a soft dry cloth.
If the surfaces are extremely dirty, use a soft cloth, dipped into a soap and water solution or a weak detergent solution.
Wring the cloth well before wiping the unit.
Wipe once again with a soft dry cloth.
Never use alcohol, paint thinner, benzine, nor a chemically treated cloth to clean this unit.
Such chemicals may damage the finish of your unit.

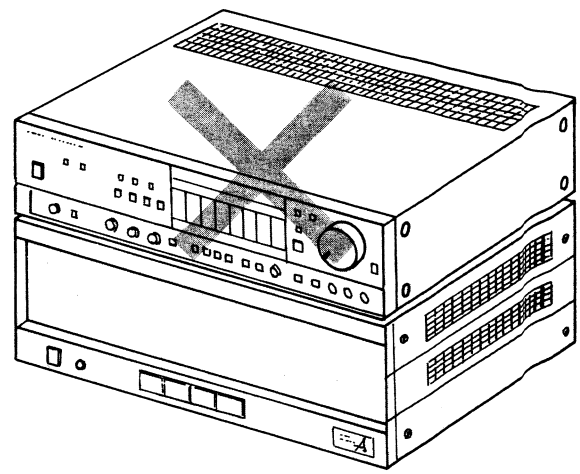
BEFORE USE

Be sure to disconnect the mains cord before adjusting the voltage selector.
Use a minus (—) screwdriver to set the voltage selector (on the rear panel) to the voltage setting for the area in which the unit will be used.

Note that this unit will be seriously damaged if this setting is not made correctly. (There is no voltage selector for some countries; the correct voltage is already set.)

PLACEMENT HINTS

- **Where ventilation is good, and where there is at least 10 cm (4") between this unit and a wall, cabinet or other equipment. (Never place this unit on top of the power amplifier.)**
- **Where humidity is low.**
- **Out of direct sunlight.**
- **A flat, vibration-free place.**
- **Away from stoves, radiators and other sources of heat.**



SUGGESTIONS FOR SAFETY

■ Use a standard electrical AC wall outlet

1. **Use from an AC power source of high voltage, such as for air conditioners, is very dangerous.**
   Be extremely careful not to make a connection to the electrical outlet for a large air conditioner or central-heating unit which uses high voltage, because there is the possibility of fire.
2. **A DC power source cannot be used.**
   Be sure to check the power source carefully, especially on a ship or other place where DC is used.

■ Connection and removal of the power cord plug

1. **Wet hands are dangerous.**
   A dangerous electric shock may result if the plug is touched by wet hands.
2. **Don't pull the power cord.**
   Always grasp the plug; never pull the cord itself.

■ AC outlets on rear panel (not equipped for some countries)

1. **Any equipment connected here should have specified power consumption or less.**
   These outlets are exclusively for the connection of other audio equipment, such as a tape deck. Be sure the power consumption does not exceed the wattage specified near the AC outlets.
2. **Never connect other electrical appliances, such as an iron or toaster.**
   If appliances with a large power consumption are connected, an unexpected accident might occur as a result of overheating.

■ Never attempt to repair or reconstruct this unit

A serious electric shock might occur if this unit is repaired, disassembled or reconstructed by unauthorized persons, or if the internal parts are accidently touched.

■ For families with children

Never permit children to put anything, especially metal, inside this unit. A serious electric shock or malfunction could occur if articles such as coins, needles, screwdrivers, etc. are inserted through the ventilation holes, etc. of this unit.

■ Turn off after use

If the unit is left for a long time with the power on, this will not only shorten its useful operation life, but may also cause other unexpected trouble.

■ If water is spilled on the unit

Be extremely careful if water is spilled on the unit, because a fire or serious electric shock might occur. Immediately disconnect the power cord plug, and consult with your dealer.

■ Place the unit where it will be well ventilated, and away from direct sunlight

Place this unit at least 10 cm (4") away from wall surfaces, etc., and away from direct sunlight. Be careful that curtains and similar materials do not obstruct the ventilation holes.

■ Keep the unit away from heaters, etc.

Heat can damage the external surfaces as well as internal circuits and components.

■ Avoid spray-type insecticides

Insecticides might cause cracks or "cloudiness" in the cabinet and plastic parts of this unit. The gas used in such sprays might, moreover, be ignited suddenly.

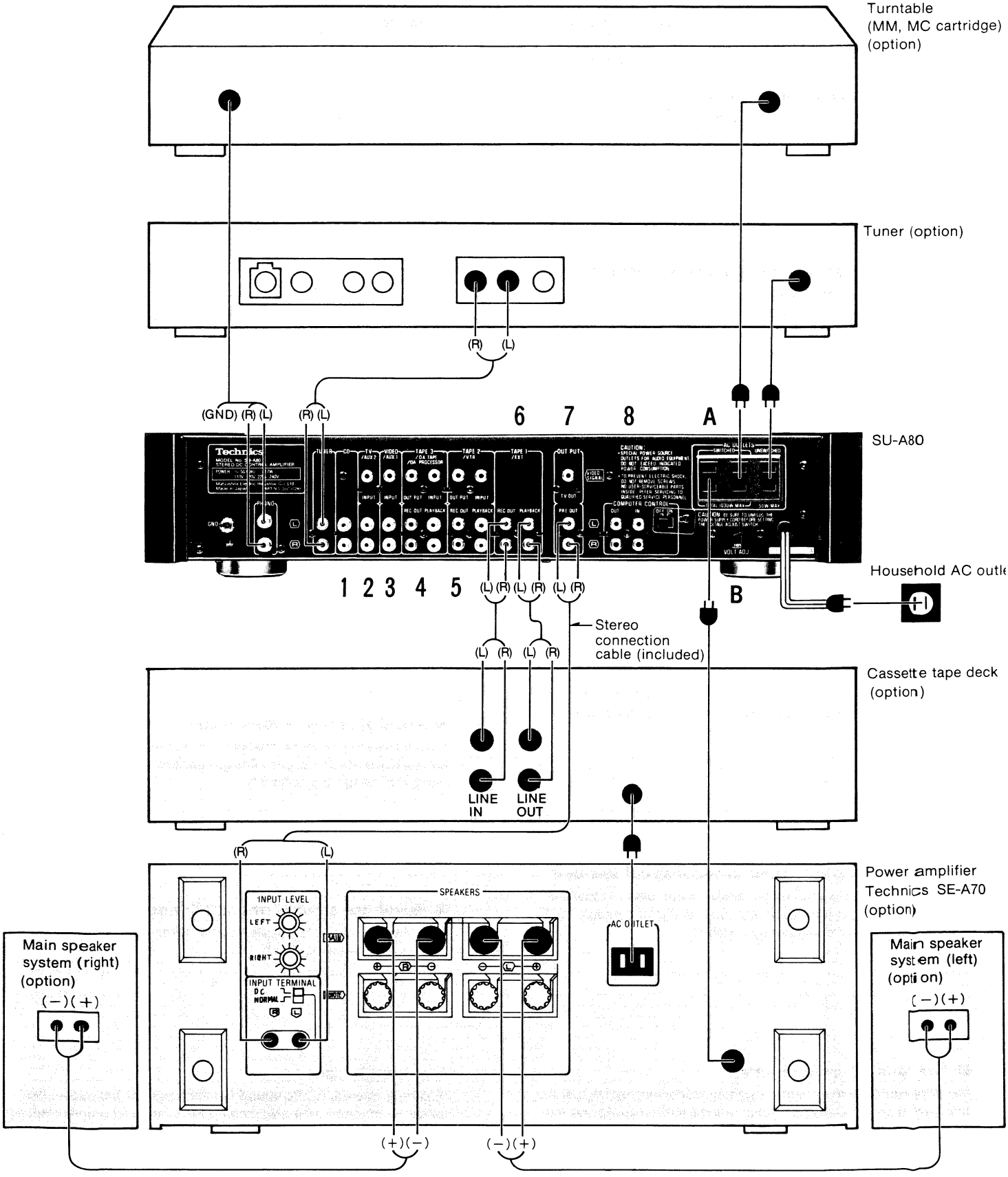
■ Never use alcohol or paint thinner

These and similar chemicals should never be used, because they may damage the finish.

■ If trouble occurs

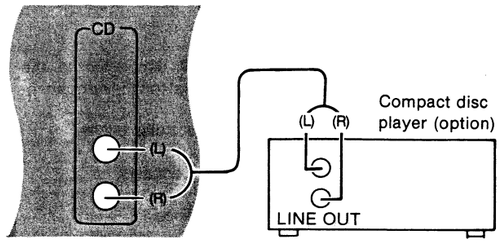
If, during operation, the sound is interrupted or indicators no longer illuminate, or if abnormal odor or smoke is detected, immediately disconnect the power cord plug, and contact your dealer or an Authorized Service Center.

STEREO SYSTEM COMPONENTS AND THEIR CONNECTIONS



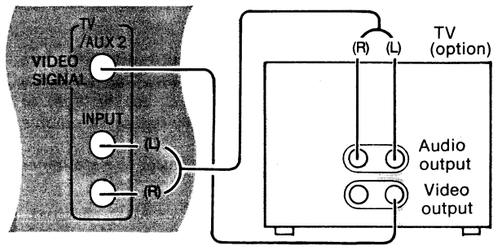
1 Compact disc (CD) terminals

Connect the compact disc player.



2 TV/auxiliary input 2 (TV/AUX 2) terminals

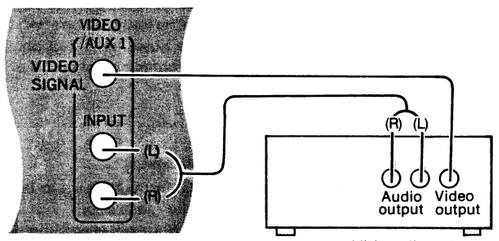
Connect a TV, etc.



Note:
A TV without audio output and video output terminals cannot be connected.

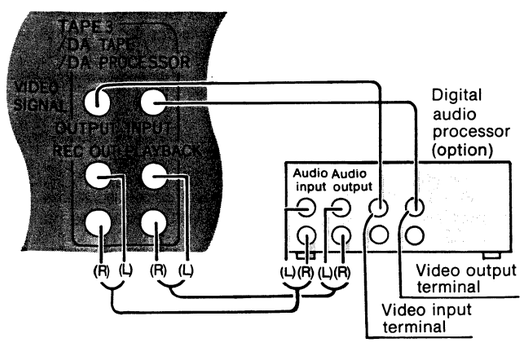
3 Video input/auxiliary input 1 (VIDEO/AUX 1) terminals

Connect a video disc player or other video equipment.



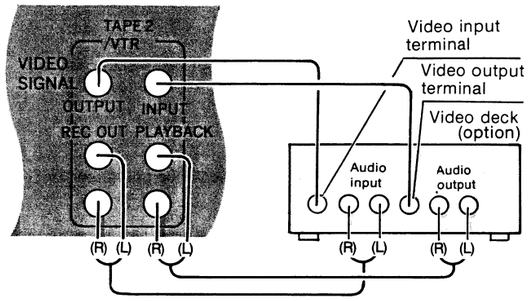
4 Tape 3/digital audio tape/digital audio processor (TAPE 3/DA TAPE/DA PROCESSOR) terminals

Connect a digital audio processor, etc.



5 Tape 2/video deck (TAPE 2/VTR) terminals

Connect a video deck or second audio tape deck.

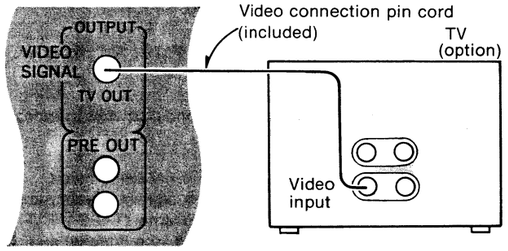


6 Tape 1/external (TAPE 1/EXT) terminals

Connect an audio tape deck, graphic equalizer, etc. (For details regarding connection of a graphic equalizer, see "Graphic equalizer connections" on page 8.)

7 TV output (TV OUT) terminal

Make a connection with the video input terminal of the TV.

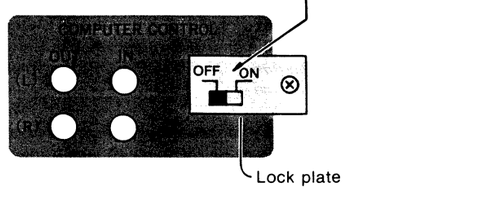


Note:
A TV without a video input terminal cannot be connected.

8 Computer control (COMPUTER CONTROL) terminals

These terminals are for connection of a computer-controlled audio selector and other components expected to be marketed in the future.

Usually set to the "OFF" position.
(When a computer control audio selector is to be connected, loosen the screw of the lock plate, and set to the "ON" position.)



A AC outlets (AC OUTLETS)

"SWITCHED" outlets:

These AC outlets are interconnected with the power switch of this unit, so that any equipment connected here is turned on and off when the power switch is turned on and off.
It is important to remember that the total combined power consumption of the two units connected to these outlets absolutely must not exceed 1030W.

"UNSWITCHED" outlet

Power is always available, regardless of power switch setting. Equipment rated up to 50 W can be connected.

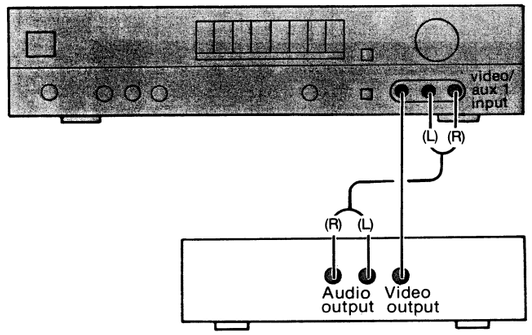
B Voltage selector (VOLT ADJ)

Before using this unit, be sure to set to correct voltage.

Video input/auxiliary input 1 (video/aux 1 input) terminals (on front panel)

Connect a video deck or other video equipment (convenient for a temporary connection).

The front panel of this unit



How to use the video adaptor (included)

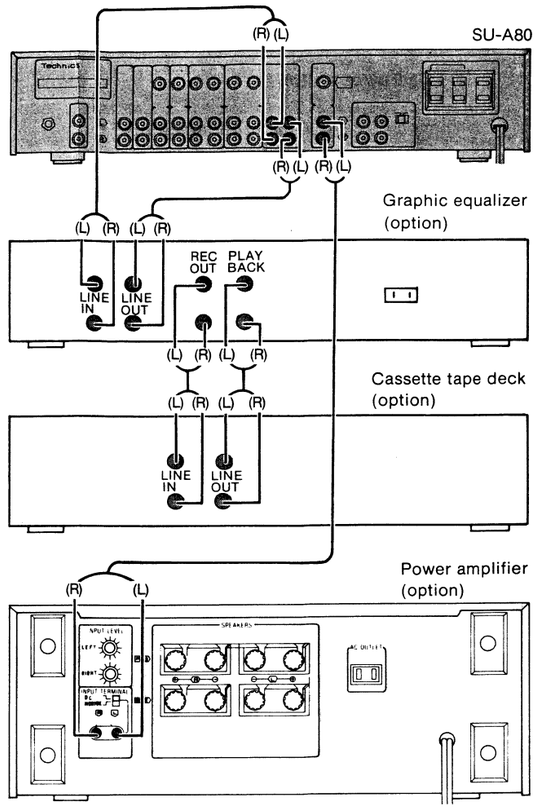
- **BNC (male) - RCA pin (female) adaptor**
  When connecting this unit to a TV set, connect this adaptor to the end of the included video connection pin-type cord and to the TV's video input terminal, and connect the other end to the TV output terminal (TV OUT) of this unit.

Connect to "TV OUT" terminal of this unit. ← → Connect to included video connection pin-type cord.

- **BNC (female) - RCA pin (male) adaptors**
  When connecting this unit to a TV, video tape deck, etc. by using a BNC cord, connect one of these adaptors each to the input signal "INPUT" and "OUTPUT" terminals of this unit, connect one end of the BNC cord to the other end of the adaptor, and then connect the other end of the BNC cord to the video output terminal of the TV or video tape deck, etc..

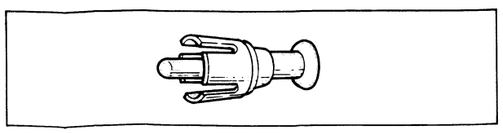
Connect one each to input signal "INPUT" and"OUTPUT" terminals of this unit. ← → Connect BNC cord here; connect other end of cord to video output terminal of TV, VTR, etc.

Graphic equalizer connections

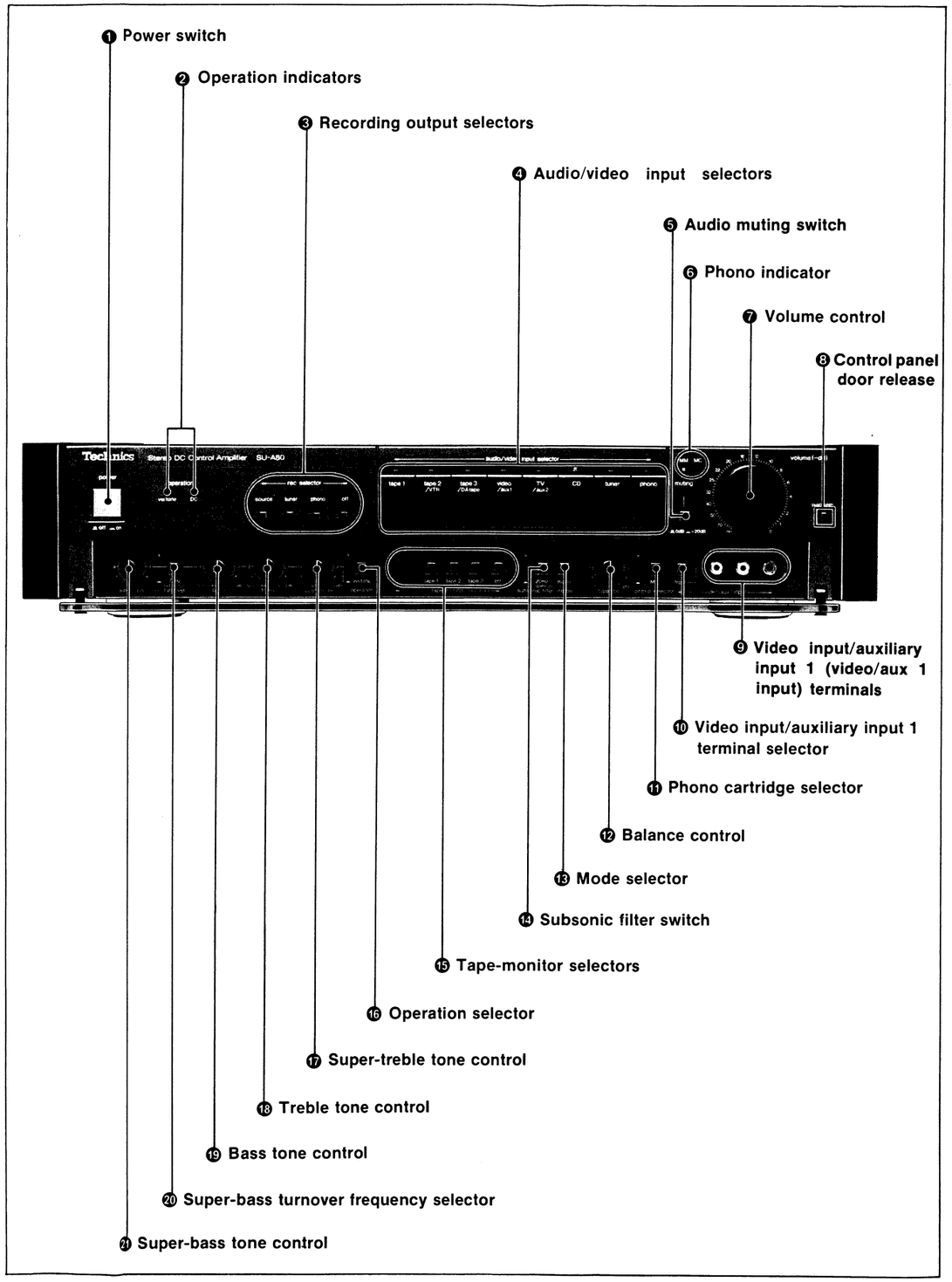


Using the short-circuit pins

The short-circuit pins connected to the "CD", "TV/AUX 2", "VIDEO/AUX 1", "TAPE 3/DA TAPE/DA PROCESSOR" and "TAPE 2/VTR" terminals (on the rear panel) are to prevent noise.
Do not remove these pins unless a terminal is to be used, and be sure to keep the pin for future use.
Never connect a pin to a "REC OUT" terminal on any other terminal.
When any terminal (mentioned above) which had a pin connected is no longer to be used, be sure to re-connect the pin.



FRONT PANEL CONTROLS AND THEIR FUNCTIONS


❶ Power switch
❷ Operation indicators
❸ Recording output selectors
❹ Audio/video input selectors
❺ Audio muting switch
❻ Phono indicator
❼ Volume control
❽ Control panel door release
❾ Video input/auxiliary input 1 (video/aux 1 input) terminals
❿ Video input/auxiliary input 1 terminal selector
⓫ Phono cartridge selector
⓬ Balance control
⓭ Mode selector
⓮ Subsonic filter switch
⓯ Tape-monitor selectors
⓰ Operation selector
⓱ Super-treble tone control
⓲ Treble tone control
⓳ Bass tone control
⓴ Super-bass turnover frequency selector
㉑ Super-bass tone control

❶ Power switch (power)

Before turning the power on, make sure the volume control of this unit is set to the minimum ("∞") position.

❷ Operation indicators

These indicators illuminate to indicate the operation condition of this unit.

via tone:
This indicator illuminates when the shelving tone circuitry is in operation. (See page 17 for additional detailed information.)

DC:
This indicator illuminates to indicate that this unit is operating as a DC amplifier (i.e., signals are not passing through the "shelving" tone circuitry).

Note:
The operation selector ⑯ is used to make the selection of "DC" or "via tone".

❸ Recording output selectors (rec selector)

These selectors are used to select the signal to be recorded by the connected tape deck.
The corresponding indicator illuminates during operation to indicate the recording source.

source:
Press this button to record from the sound source selected by the audio/video input selectors ④.

tuner:
Press this button to record from an FM or AM broadcast while listening to another sound source.

phono:
Press this button to record from a phono disc while listening to another sound source.

off:
Press this button when a recording is not being made.
Note that, when this button is pressed, signals for recording will not be available from the tape 1/external (TAPE 1/EXT), tape 2/video deck (TAPE 2/VTR), and tape 3/digital audio tape/digital audio processor (TAPE 3/DA TAPE/DA PROCESSOR) terminals on the rear panel.

❹ Audio/video input selectors (audio/video input selector)

These selectors are used for selection of the program source (disc, radio broadcast, etc.). The corresponding indication lamp (in the upper half of the panel) will illuminate when that program source is selected.

tape 1:
Press this button when the tape deck connected to the tape 1/external (TAPE 1/EXT) terminals (on the rear panel) is to be used for playback.

tape 2/VTR:
Press this button when the video deck, audio tape deck, etc., connected to the tape 2/video deck (TAPE 2/VTR) terminals (on the rear panel) is to be used for playback.

tape 3/DA tape:
Press this button when the digital audio processor, etc., connected to the tape 3/digital audio tape/digital audio processor (TAPE 3/DA TAPE/DA PROCESSOR) terminals (on the rear panel) is to be used.

video/aux 1:
Press this button when the video disc player, etc., connected to the video input/auxiliary input 1 terminal (on the front or rear panel) is to be used.

TV/aux 2:
Press this button to watch the TV connected to the TV/auxiliary input 2 (TV/AUX 2) terminal (on the rear panel).

CD:
Press this button to listen to a compact disc player.

tuner:
Press this button to listen to radio broadcasts.

phono:
Press this button to listen to phono discs.

❺ Audio muting switch (muting)

This switch can be used to cut off or attenuate the output.

0 dB(▲→■):
Set to this position for ordinary use.

−20 dB(■→▲):
Set to this position to attenuate the output level from the "pre out" output terminals by 20 dB (1/10). This setting is especially convenient for changing a disc or tape, or whenever it is necessary to temporarily reduce the volume level.
In addition, at this position it is also easier to make miner adjustments of the volume level.

❻ Phono indicator

This indicator shows the position of the phono cartridge selector ⑪.

❼ Volume control (volume)

This control is used to adjust the volume level.
Be absolutely sure to set this control to the low position ("∞") before turning the power on. After the power is turned on, please wait several seconds before increasing the volume level.

❽ Control panel door release (push open)

If any of the controls and selectors ⑨ through ㉑ are to be operated, press this button to open the glass door.
When this button is pressed, the glass door will open slowly by means of a damper mechanism.

❾ Video input/auxiliary input 1 (video/aux 1 input) terminals

These terminals are for connection of an auxiliary input source, including a video deck or other video equipment. These terminals are convenient for use for a temporary connection. (See page 8 for details regarding the connection.)

❿ Video input/auxiliary input 1 terminal selector

rear (▲→■):
Set to this position to use the equipment connected to the video input/auxiliary input 1 (VIDEO/AUX 1) terminals on the rear panel.

front (■→▲):
Set to this position to use the equipment connected to the video input/auxiliary input 1 (video/aux 1 input) terminal on the front panel.

⑪ Phono cartridge selector (phono selector)

This selector should be set to the position which corresponds to the type of cartridge used on the turntable.

MM (▲→■):

Set to this position when using a moving-magnet type cartridge.

MC (■→▲):

Set to this position when using a moving-coil type cartridge.

⑫ Balance control (balance)

To balance the left and right volume levels, set the mode selector ⑬ to the "mono" position, and use this control to balance the sound so that it seems to be heard from the position half-way between the speakers.

⑬ Mode selector (mode)

stereo (▲→■):

Set to this position to listen in stereo.

mono (■→▲):

Set to this position to listen monaurally. The left and right sounds will be mixed, and the same sounds will be heard from both speakers.

⑭ Subsonic filter switch (subsonic filter)

off (▲→■):

Set to this position for ordinary use.

20 Hz (■→▲):

Set to this position to eliminate ultra-low-frequency noise such as motor "rumble" and unusual vibration of the woofer cone caused by a warped disc, etc.

⑮ Tape-monitor selectors (tape monitor)

Press this button to monitor the sound from a tape deck. The indicator will illuminate.

tape 1/ext:

Press this button to listen to the sound being recorded by the equipment connected to the tape 1/external (TAPE 1/EXT) terminals (on the rear panel).

Also press this button for playback through a graphic equalizer connected to the tape 1/external equipment (TAPE 1/EXT) terminals.

tape 2/VTR:

Press this button to listen to the sound being recorded by the equipment connected to the tape 2/video deck (TAPE 2/VTR) terminals (on the rear panel).

tape 3/DA tape:

Press this button to listen to the sound being recorded by the equipment connected to the tape 3/digital audio tape/digital audio processor (TAPE 3/DA TAPE/DA PROCESSOR) terminals (on the rear panel).

off:

Be sure to press this button when a recording is not being made.

⑯ Operation selector (operation)

This selector is used in order to obtain the maximum performance capability of the DC main amplifier section of this unit, driving the speaker systems with the best frequency response of high-level input signals.

straight DC (▲→■):

When the selector is set to this position, the high-level input signals received at the "CD" and "TUNER" terminals are directly amplified by the main amplifier section, without passing through the tone-control circuitry. The unit operates as a complete direct-coupled amplifier to drive the speaker system.

Note that the tone controls ⑰~㉑ have no effect when the selector is set to this position.

via tone (■→▲):

When the selector is set to this position, input signals pass through the tone-control circuitry on their way to the main amplifier section.

⑰ Super-treble tone control (super treble)

This control is used to adjust the tone quality (within a range of ±10 dB) of the high-range sound above 8 kHz.

⑱ Treble tone control (treble)

This control is used to adjust the tone quality (within a range of ±5 dB) of the high-range sound above 2 kHz.

⑲ Bass tone control (bass)

This control is used to adjust the tone quality (within a range of ±5 dB) of the low-range sound below 500 Hz.

⑳ Super-bass turnover frequency selector (turnover)

This selector is used to select the frequency at which the function of the super-bass tone control ㉑ will begin to take effect.

Select either "75 Hz" or "150 Hz" in accordance with the characteristics of the speaker systems being used.

㉑ Super-bass tone control (super bass)

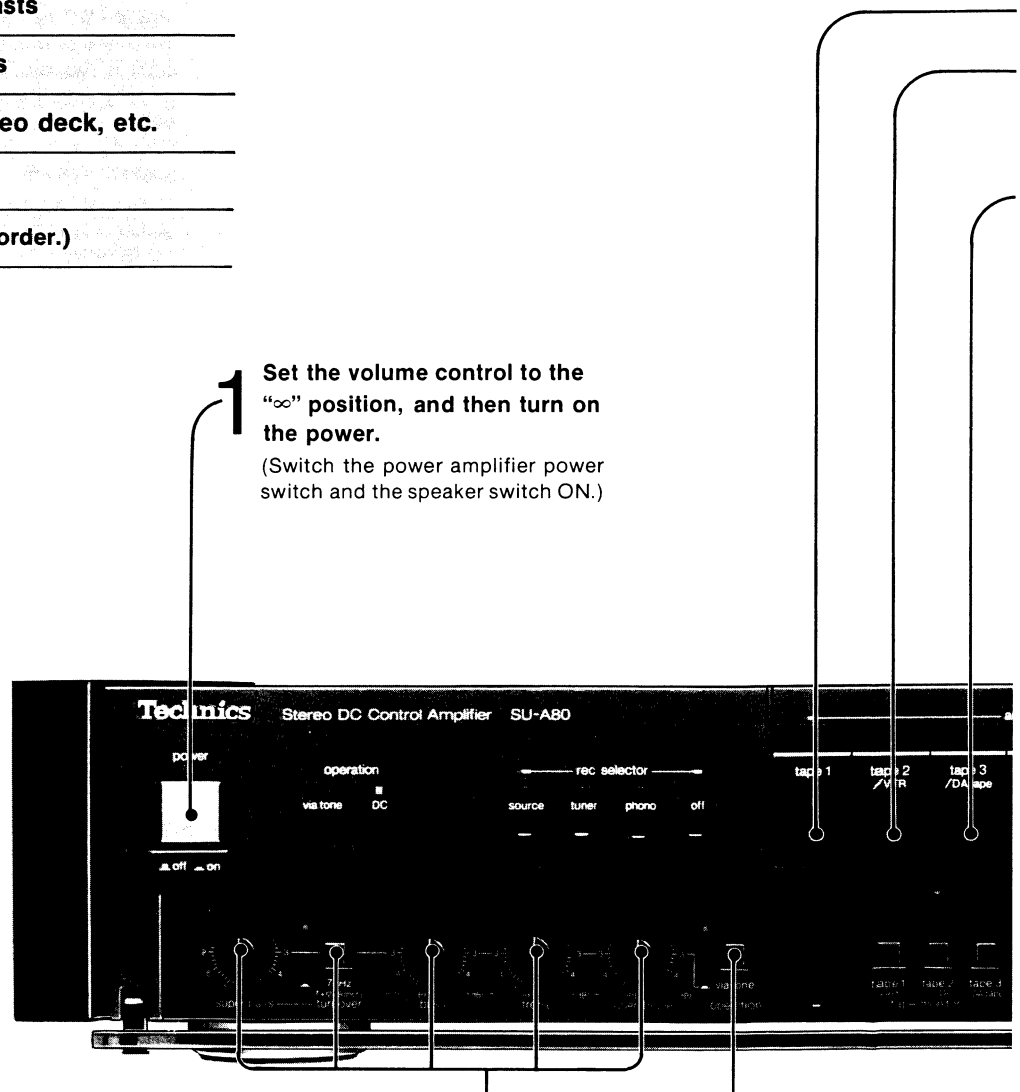
This control is used to adjust the tone quality (within a range of 0 dB~+10 dB) from the standard frequency selected by setting the super-bass turnover-frequency selector for the ultra-low-range sound.

OPERATION

- **To listen to phono discs**
- **To listen to radio broadcasts**
- **To listen to compact discs**
- **To watch TV or play a video deck, etc.**
- **To listen to tapes**

(Follow all steps in numbered order.)

1 Set the volume control to the "∞" position, and then turn on the power.
(Switch the power amplifier power switch and the speaker switch ON.)



- Press inward to the "via tone" (■→▬) position before making adjustment of the tone quality (from the super-bass range to the super-treble range). (Refer to page 17 for additional detailed information.)

- These controls are used to make the adjustment of the tone quality (from the super-bass range to the super-treble range). (Refer to page 17 for additional detailed informati

• To listen to sound processed by an equalizer

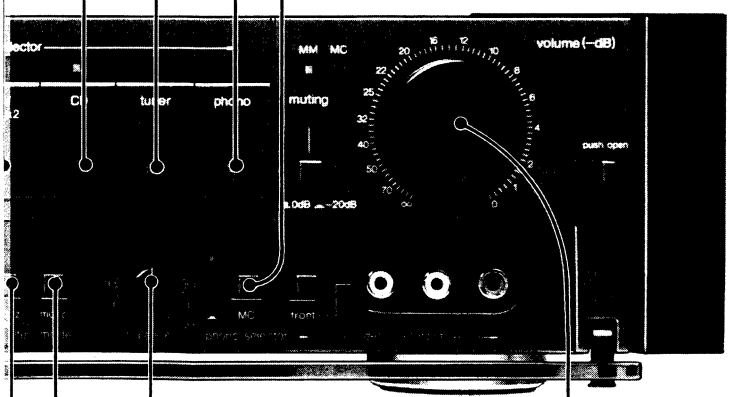
1. Connect the graphic equalizer to this unit. (See page 8.)
2. Switch ON the power of this unit.
3. Press the recording output selector marked "source".
4. Press the tape-monitor selector marked "tape 1/ext".
5. Follow steps 2 through 4. (Note that each tone control should be set to the "flat" position).
6. Adjust the tone by using the controls of the graphic equalizer.
   (For details, refer to the operation instructions of the graphic equalizer.)

2 Press the button related to the sound source.
(The following explanation is for connections made as described on pages 6 through 8.)

- Press to listen to tape.
- Press to playback a video deck, etc.

Note
Be sure to set the video/TV selector (on the video deck) to the "TV" position after video tape playback is finished.

- Press to use a digital audio processor, etc.
- Press to playback a video disc player, etc.
- Press to watch the TV, etc.
- Press to listen to a compact disc.
- Press to listen to FM or AM broadcasts.
- Press to listen to a phono disc.
(Select either MM (▬→▮) or MC (▮→▬)).



- Adjust the volume level (↗) to the desired level.
- Make adjustment, if necessary, to correct any difference of volume level between left and right channels.
- Set to the "stereo" (▬→▮) position.
- Press inward to the "20 Hz" position to eliminate bass noises, such as turntable motor "rumble", etc.

The following video signals are available from the "TV OUT" terminal (on the rear panel) for each audio/video input selector.

Video output signal / Input selector	"TV OUT" terminal
phono tuner CD tape 1	TV input signal
TV/aux 2	TV input signal
video/aux 1 (rear)	Video (rear) input signal
video/aux 1 (front)	Video (front) input signal
tape 3/DA tape	TV input signal
tape 2/VTR	VTR input signal

3 Operate each component. (Refer to the operation instructions of each component.)

4 Follow these steps, as necessary, for all operations after adjustment of volume level.

Suggestions

- To prevent noise while listening to an FM or AM broadcast, switch OFF the TV, compact disc player and turntable.
- When watching TV, set the volume control of the TV to the minimum position and adjust the volume level on this unit.
- Because it may cause unwanted distortion of the TV picture, switch OFF the digital audio processor when watching TV.
- If in step 2 above an input selector other than "tape 2/VTR", "video/aux 1", or "TV/aux 2" is pressed, switch OFF the TV in order to avoid noise.

RECORDING (audio)

Three tape decks can be connected to this unit, and
- recording on all 3 decks at the same time,
- recordings of a disc or from an FM or AM broadcast while enjoying another sound source (for example, an FM stereo broadcast or other source could be recorded while listening to a phone disc),
- tape dubbing (recording from a recorded tape to another tape), etc., are all possible.

In addition, a video deck or digital audio tape can be connected to the "TAPE 2/VTR" or "TAPE 3/DA TAPE/DA PROCESSOR" terminals (on the rear panel), for several interesting possibilities such as:
- Digital recording of sound from a compact disc or other source.
- High-fidelity recording on a hi-fi video.

To record from a phono disc or FM or AM broadcast

The program source signals from the phono disc, FM or AM broadcast, etc., selected by the recording output and input selectors are output from the "TAPE 1/EXT", "TAPE 2/VTR", and "TAPE 3/DA TAPE/DA PROCESSOR" recording output terminals (on the rear panel).
These signals remain at a constant level, and are not affected by changes made in the settings of the volume control, tone controls, or other controls and switches.

■ **Recording steps**
1. Press the recording output selector marked "source".
2. Press the input selector corresponding to the program source to be recorded.
3. Begin the program source to be recorded.
4. Adjust the recording level by using the controls on the tape deck, and then begin the recording.

To record from a phono disc or an FM or AM broadcast while enjoying another program source

The recording output selectors can be used to record from a phono disc or an FM or AM radio broadcast while, for example, listening to a compact disc.
Select the program source to be recorded by pressing the corresponding recording output selector ("phono" or "tuner"), and select the other program source (to be enjoyed while the recording is being made) by pressing the corresponding input selector.

Suggestions:
If you plan to watch TV while the recording is being made, move the turntable, or the FM or AM antenna, away from the TV in order to avoid noise.

Digital recording of compact disc sound

To make this type of recording, connect the compact disc player to the "CD" terminals, the digital audio processor to the "TAPE 3/DA TAPE/DA PROCESSOR" terminals, and a video deck to the "TAPE 2/VTR" terminals (all on the rear panel).

■ **Recording steps**
1. Press the recording output selector marked "source".
2. Press the input selector marked "CD".
3. Begin playing the compact disc.
4. Refer to the operation instructions of the digital audio processor, and begin the recording on the video deck.

Tape-to-tape recording

Using the tape deck terminals on the rear panel

Tape dubbing is possible from tape deck 1 to tape decks 2 and 3, from tape deck 2 to 1 and 3, and from tape deck 3 to 1 and 2.

Tape deck 1 is the tape deck connected to the "TAPE 1/EXT" terminals, tape deck 2 is the tape deck connected to the "TAPE 2/VTR" terminals, and tape deck 3 is the tape deck connected to the "TAPE 3/DA TAPE/DA PROCESSOR" terminals.

■ **Dubbing steps**
1. Press the recording output selector marked "source".
2. Press the input selector corresponding to the tape deck to be used for playback.
3. Begin the operation of the playback deck and the recording deck(s), and begin the dubbing.

Using the "video/aux 1 input" terminals on the front panel

If a tape deck for playback is connected to these terminals, simultaneous recording (dubbing) to tape decks 1, 2 and 3 is possible.

■ **Dubbing steps**
1. Press the recording output selector marked "source".
2. Press the input selector marked "video/aux 1".
3. Press the video input/auxiliary input 1 terminal selector to the "front" (▮→▲) position.
4. Begin playback of the tape deck connected to the front panel terminals.
5. Adjust the recording level of the tape deck(s) connected to the rear panel terminals, and then begin the recording.

Tape monitoring (three-head type tape deck only)

If the tape deck being used is the 3-head type, the tape-monitor selector can be used to check the progress of the recording. If, for example, the tape-monitor selector is set to the "off" position during the recording, the sound can be heard the instant before it is recorded, and if the "tape 1", "tape 2/VTR" or "tape 3/DA tape" tape-monitor selector is pressed, the sound of can be heard the instant after it is recorded on each respective tape deck.

Note:
If the "tape 1", "tape 2/VTR", or "tape 3/DA tape" input selector has been pressed, and then the corresponding tape-monitor selector ("tape 1/ext", "tape 2/VTR", or "tape 3/DA tape") is pressed, the indicator for the input selector will go out, and the tape monitor will have priority.

To record sound processed by an equalizer

Record by using the tape deck connected to the graphic equalizer. (See page 8 for information regarding the connection.)
Note that recordings of sound processed by the graphic equalizer cannot be made by a tape deck connected to the "TAPE 2/VTR" or "TAPE 3/DA TAPE/DA PROCESSOR" terminals.

Notes regarding timer recordings

■ **Do not make a timer recording of TV sound on a tape deck.**

This is because, if such a recording were made, current which exceeds the capacity of the timer could temporarily flow to the timer when the power of the TV switches ON.

RECORDING (video)

The following video signals are available from the "OUTPUT" terminals (of the "TAPE 2/VTR" terminals on the rear panel) for each input selector.

Video output signal / Input selector	"OUTPUT" terminals (of "TAPE 2/VTR" terminals)
phono tuner CD tape 1	Digital audio processor input signal
TV/aux 2	TV input signal
video/aux 1 (rear)	Video (rear) input signal
video/aux 1 (front)	Video (front) input signal
tape 3/DA tape	Digital audio processor input signal
tape 2/VTR	Digital audio processor input signal

To record TV broadcasts

■ **Recording steps**
1. Press the recording output selector marked "source".
2. Press the input selector marked "TV/aux 2".
3. Tune to the broadcast on the TV.
4. Begin recording on the video deck. (Refer to the operation instructions of the video deck.)

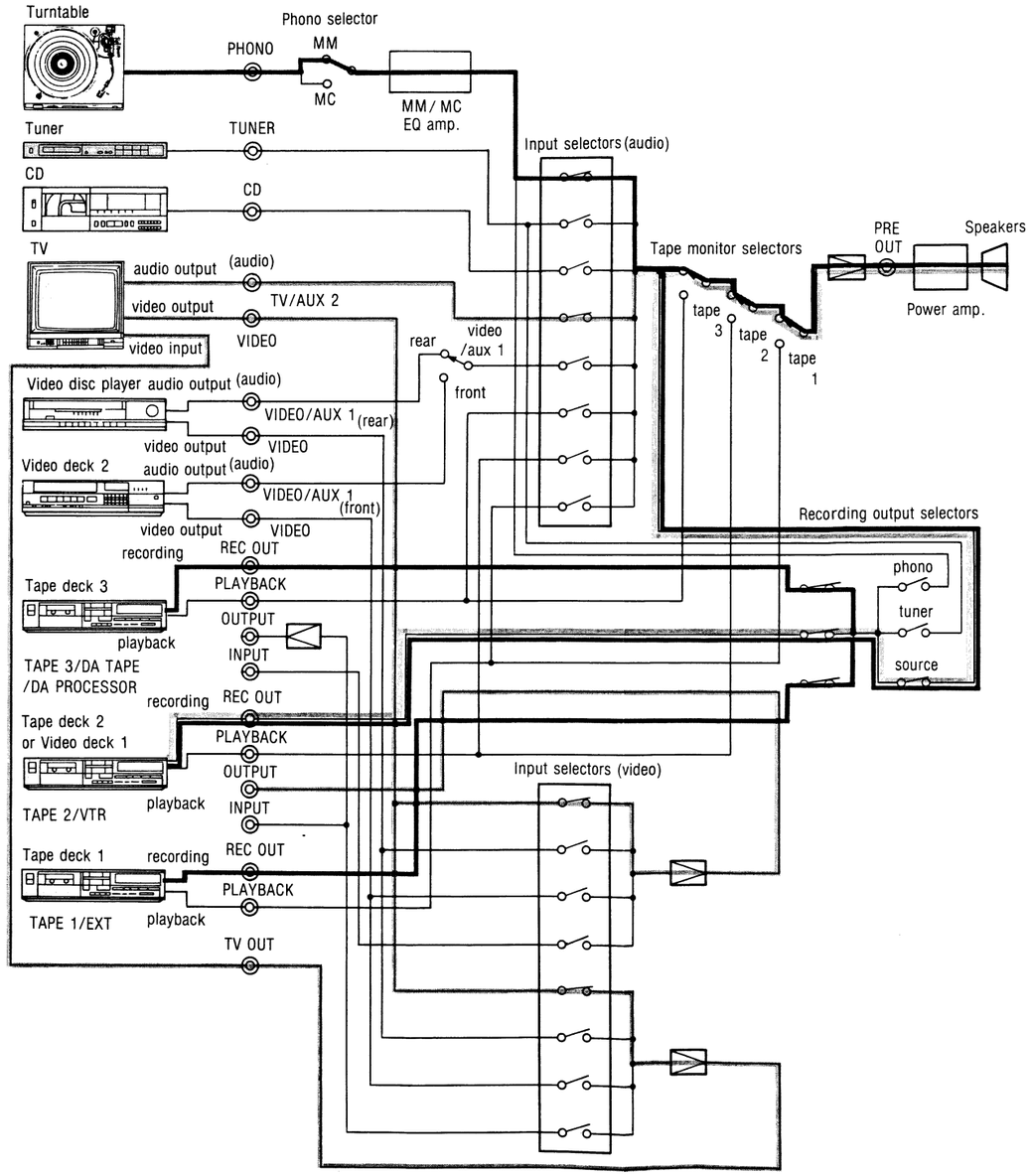
To dub a video tape

A copy of a video tape can be made by connecting a video deck for playback to the "video/aux 1 input" terminals on the front panel.

■ **Dubbing steps**
1. Press the recording output selector marked "source".
2. Press the input selector marked "video/aux 1".
3. Press the video input/auxiliary input 1 terminal selector to the "front" (▮→▲) position.
4. Begin playback of the video deck connected to the front panel terminals.
5. Begin the recording of the video deck connected to the rear panel.
   (Refer to the operation instructions of the video deck.)

■ **To record from a phono disc to 3 tape decks** ——

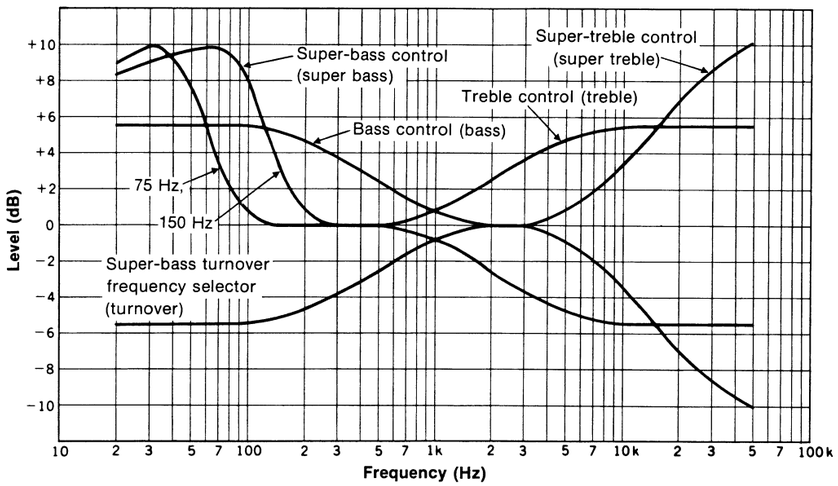
■ **To record TV broadcasts** ——



HOW TO USE THE "SHELVING" TONE CONTROLS

The tone controls of this unit are designed so that the tone quality can be changed by changing the entire frequency response of the reproduction equipment, thus making it possible to obtain the desired sound reproduction.
It is for this reason that a wide variable range and easy operation are so important in order to take full advantage of the conditions of the listening room and the characteristics of the equipment.
Conventional tone controls were only able to make frequency variations, by increasing or attenuating bass and treble sound above or below the 1-kHz central point of reference.
This type of tone control was, therefore, suitable for balancing bass and treble sound, but was unsuitable, for example, for delicate adjustments of tone quality such as changing one portion of the super-bass or super-treble sound, because this caused changes of mid-treble or mid-bass, etc.
The "shelving" tone controls equipped on this unit include (in addition to the conventional controls for the treble range and the bass range) controls for the super-treble range and the super-bass range, thus making it possible, as shown in the figure below, to change the frequency response within the super-treble range and the super-bass range.
Furthermore, the super-bass control boosts only the super-bass sounds (ultra low frequencies) at a sharp rate of 12 dB/octave. The starting frequency for this boost can be set at either 75 Hz or 150 Hz. As the figure below shows, the tone is controlled through step-like (shelving) frequency characteristics, and this is therefore called the shelving tone control.
By using these tone controls, therefore, it is now possible to enjoy a new and unprecedented dimension of freedom when making adjustments of tone quality, so that, for example, the super-bass portion of the sound of the bass drum or the pipe organ can be especially emphasized without distorting the tonal balance of the original sound.

"Shelving" tone characteristics



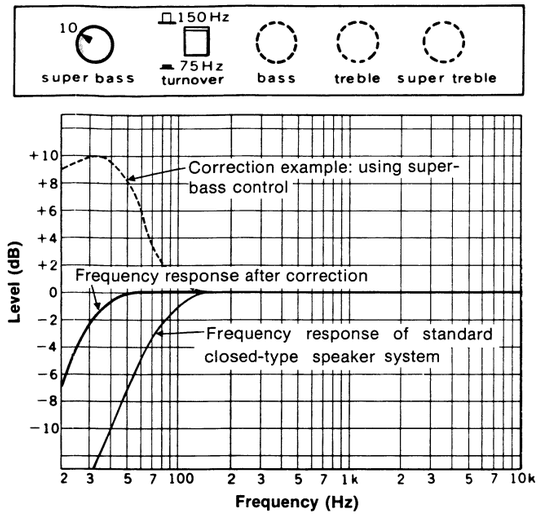
Control by using the bass tone control ⑲ (bass) and the super-bass tone control ㉑ (super bass)

■ Reproduction of super-bass sound

In general, low-range (bass) sound cannot be heard well from small speakers, and, furthermore, the lowest resonance frequency (fo), which is determined by the volume of the speaker cabinet, especially limits the reproduction of low-range sound.
As shown in figure 1, for example, the fo for a standard closed speaker system is approximately 70 Hz, and frequencies below that point decrease with a sharp slope of −12 dB/octave, becoming small in the so-called "deep" bass range of about 30 Hz.
In this instance, the super-bass control can be used to modify the frequency response, thus making the reproduction of deep bass sound down to 35 Hz possible.
For this example, the settings of the controls are as follows:

- Super-bass turnover-frequency control (turnover frequency): 75 Hz
- Super-bass tone control (super bass): +10 dB
  In other words, if the lowest resonance frequency (fo) of the speakers being used is known, it is possible to make the corrections shown in the figure below by setting the turnover-frequency control to that frequency.

Fig. 1 Example of correction for speaker system being used by using super-bass control of this unit



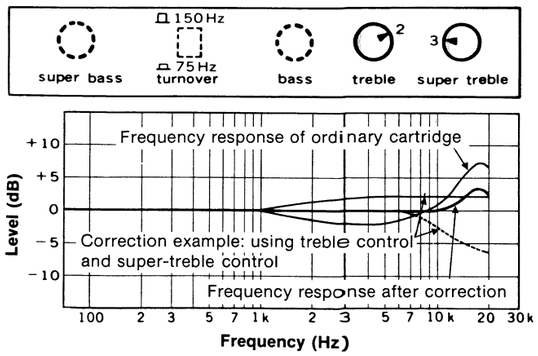
■ Actual bass reproduction

The reproduction frequency response of the speakers at the listening position greatly changes depending upon the arrangement of the speakers, as well as of course the dimensions of the room and its audio characteristics.
If, for example, the speakers are placed so that they are close to a hard wall, which therefore reflects sound waves, the sound-pressure level in the low-frequency range increases, when compared to speakers used in an echo-free space. This phenomenon is because of the "mirror-image" principle caused by the reflection of sound waves by the wall. And, if speaker systems are placed in the corners of the room, the bass sound will become even more strongly emphasized.
In such instances as these, the bass control and the super-bass control can be used together to fully reproduce the super-bass sound while suppressing bass sound which has become too emphatic.
In other words, a powerful super-bass sound can be faithfully reproduced, without unnecessary emphasis, by setting the bass control to a position from about "−2 dB" to "−5 dB" in order to attenuate the bass level, and, as described previously, setting the super-bass control so as to obtain an increase of +10 dB.

Control by using the treble tone control ⑱ (treble) and the super-treble tone control ⑰ (super treble)

The phono cartridge, which is the first step from the disc to the listener, performs the function of converting the disc's mechanical vibrations to electrical signals.
Unfortunately, the phono cartridge, which makes the conversions to electric signals, has the technological problem, when compared to a high-quality amplifier, etc., that a flat frequency response is difficult to obtain.
Although there are slight variations of the frequency response depending upon ambient temperature and humidity, the frequency response of an ordinary phono cartridge usually has, as shown in the figure below, a "dip" (level decrease) of about 2 dB to 3 dB in the mid-high frequency range of 3 kHz to 6 kHz, and, conversely, a "peak" (level increase) of a maximum of 6 dB in the high-frequency range of 10 kHz to 20 kHz.
Because this change of frequency response will appear as a difference in the tone color of the cartridge, the use of various cartridges, each for a different type of music, is one way in which audio enthusiasts obtain an even greater enjoyment from the sound-listening experience.
If, however, it were possible to obtain a more nearly flat frequency response of the cartridge, music could be enjoyed under conditions closer to the ideal.
The "shelving" tone controls of this unit have the function of controlling the independent mid-high and high sound of the treble range and the super-treble range.
Consequently, by using the treble control, which has a turnover frequency of 2 kHz, to increase the level in the frequency range from 3 kHz to 6 kHz (the +2 point in the figure below), or by using the super-treble control, which has a turnover frequency of 8 kHz, to attenuate the high-range level in the frequency range from 10 kHz to 20 kHz (the −3 point in the figure below), it is thus possible to make minute tonal adjustments which were until now impossible with ordinary tone controls.
Other, more definite uses include the capability to control consonants without changing voice quality, to make more brilliant (or soften) the nuances of high-range musical instruments as the violin, trumpet, etc., and, in general, to add to the interest and enjoyment of music above and beyond the general control of the music itself.

Fig. 2 Example of correction of frequency response of phono cartridge by using treble control and super-treble control of this unit



TECHNICAL SPECIFICATIONS

(IHF '78)

■ AUDIO SECTION

Frequency response

PHONO MM	20 Hz~20 kHz RIAA standard curve ±0.2 dB 20 Hz~100 kHz RIAA standard curve ±0.5 dB
TUNER, CD, VIDEO/AUX 1, TV/AUX 2, TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR	20 Hz~20 kHz, +0 dB, −0.1 dB 0.5 Hz~200 kHz, +0 dB, −3 dB

Total harmonic distortion (20 Hz~20 kHz)

PHONO MM	0.002% (0.5V output at vol. −30 dB) 0.002% (3V output at vol. max.)
PHONO MC	0.015% (0.5V output at vol. −30 dB) 0.003% (3V output at vol. max.)
TUNER, CD, VIDEO/AUX 1, TV/AUX 2, TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR	0.002% (0.5V output at vol. −30 dB) 0.002% (3V output at vol. max.)

Input sensitivity

PHONO MM	0.63 mV (2.5 mV, IHF '66)
MC	25 μV (100 μV, IHF '66)
TUNER, CD, VIDEO/AUX 1, TV/AUX 2, TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR	36 mV (150 mV, IHF '66)

S/N (IHF, A)

PHONO MM	80 dB (90 dB, IHF '66)
MC	77 dB (75 dB, IHF '66)
TUNER, CD, VIDEO/AUX 1, TV/AUX 2, TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR	97 dB (106 dB, IHF '66)

Maximum input voltage

PHONO MM	150 mV (160 mV, 1 kHz)

Input impedance

PHONO MM	47 kilohms
MC	220 ohms
TUNER, CD, VIDEO/AUX 1, TV/AUX 2, TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR	47 kilohms

Output voltage

PRE OUT	rated 2V max. 8V
TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR (REC OUT)	150 mV

Output impedance

TAPE 1/EXT, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR (REC OUT)	600 ohms
PRE OUT	2 ohms

Turnover frequency

BASS	500 Hz
SUPER BASS (12 dB/oct.)	75 Hz, 150 Hz
TREBLE	2 kHz
SUPER TREBLE	8 kHz
SUBSONIC FILTER (−12 dB/oct)	20 Hz

Shelving tone

BASS (50 Hz)	−5 dB~+5 dB
SUPER BASS (30 Hz)	0 dB~+10 dB
TREBLE (20 kHz)	−5 dB~+5 dB
SUPER TREBLE (50 kHz)	−10 dB~+10 dB
Muting	−20 dB

■ VIDEO SECTION

(VIDEO/AUX 1, TV/AUX 2, TAPE 2/VTR, TAPE 3/DA TAPE /DA PROCESSOR)

Output voltage (at 1V input, 75 ohms unbalanced)	1±0.1Vp-p
Maximum input voltage	1.5Vp-p
Input/output impedance	75 ohms unbalanced

■ GENERAL

Power consumption	17W
Power supply	AC 110V/120V/220V/240V, 50 Hz/60 Hz
Dimensions (W×H×D)	476 × 99.5 × 360 mm (18-23/32" × 3-7/8" × 14-3/16")
Weight	6.7 kg (14.74 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

TROUBLESHOOTING GUIDE

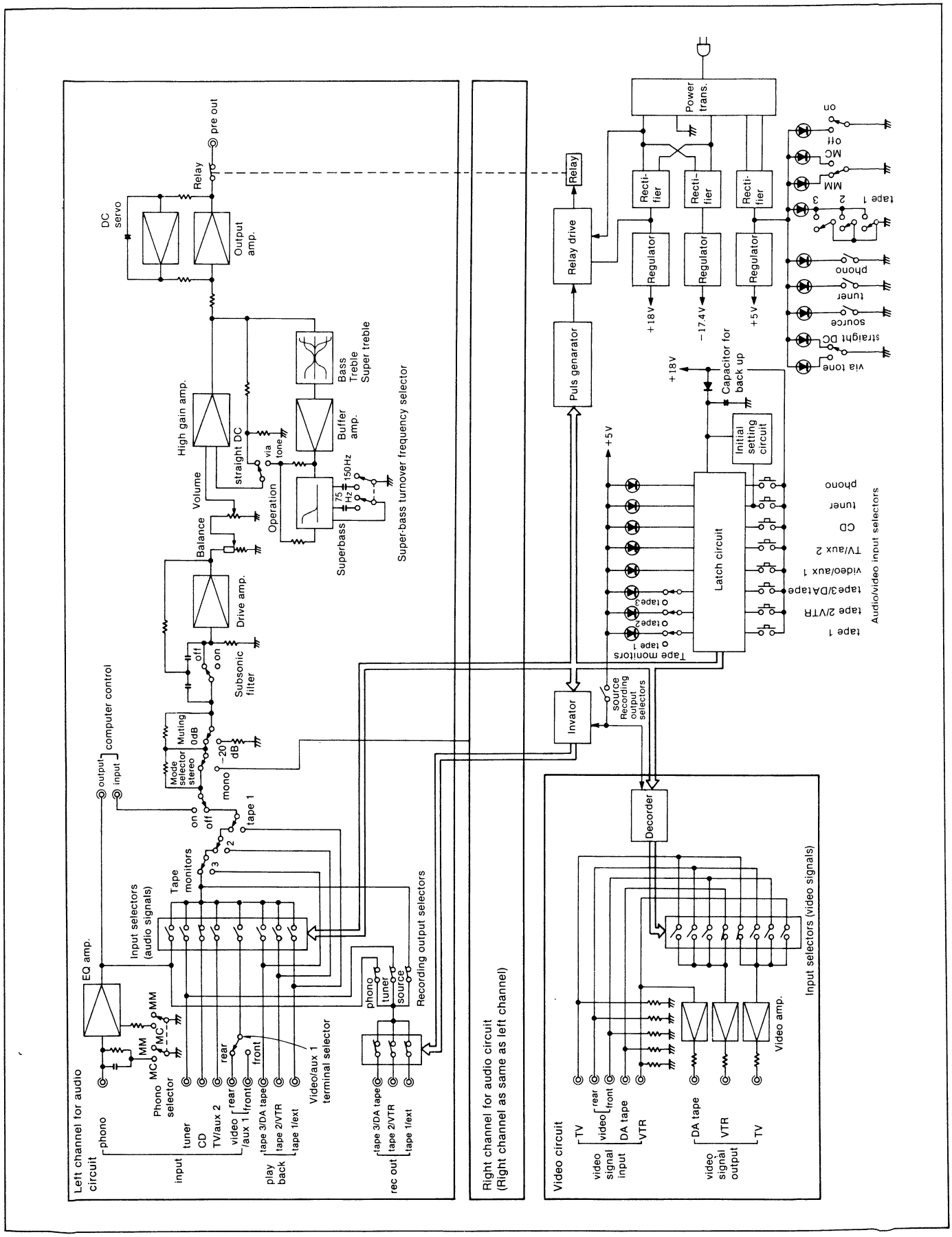
Before requesting service for this unit, check the chart below for a possible cause of the problem you are experiencing. Some simple checks or a minor adjustment on your part may eliminate the problem and restore proper operation.

If you are in doubt about some of the check points, or if the remedies indicated in the chart do not solve the problem, refer to the directory of Authorized Servicenters (enclosed with this unit) to locate a convenient servicenter, or consult your Technics dealer for instructions.

	Problem	Probable cause(s)	Suggested remedy
During disc play	**A loud and unusual sound ("howling") is heard when the volume level is increased.**	The location of the turntable and speaker systems is unstable.	• Set the subsonic filter switch ⑭ to the "20 Hz" position. • If the equipment is unstable because it is located upon a soft surface, such as a carpet, place a solid material (such as concrete blocks, bricks, a hard board, etc.) beneath the speaker systems. • Close the cover of the turntable. • Try moving the turntable farther away from the speaker systems. • Try placing a cushioning material (such as felt or commercially available audio insulators) beneath the turntable.
	Unusual scratching noises are heard.	Disc is old or scratched.	• Turn the super treble tone control ⑰ and the treble tone control ⑱ to reduce the treble sound.
		Dust in disc grooves.	• Use a disc cleaner to remove the dust from the disc grooves.
		Stylus needle is worn.	• If the noise is heard even when a new disc is played, probably the stylus is worn. Replace it with a new stylus.
		Dust is attached to stylus tip.	• Remove the dust by using a soft brush.
	The sound lacks clarity and volume.	The phono cartridge selector ⑪ is incorrectly set to the "MM" position when a moving-coil type cartridge is being used.	• Set the phono cartridgeselector to the "MC" position.
	The high-frequency range cannot be clearly heard.	The phono cartridge selector ⑪ is incorrectly set to the "MC" position when a moving-magnet type of cartridge is being used.	• Set the phono cartridge selector to the "MM" position.
While listening to FM broadcasts	**An unusual hissing noise is heard when listening to the broadcast in stereo, but not heard when listening monaurally.**	A slight noise may be heard because the method used for modulation of FM stereo broadcasts is different than that used for monaural broadcasts.	• Try reducing the treble sound by turning the super treble tone control ⑰ and treble tone control ⑱. • Try changing the location, height and/or direction of the antenna. • If an interior antenna is being used, change to an exterior antenna. • Try using an antenna with more elements.
	Noise is excessive in both stereo and monaural broadcasts.	Poor location and/or direction of the antenna. Transmitting station is too far away.	
	Sound is distorted and/or the volume level becomes low.	Broadcast signals are being disturbed. Nearby automobile traffic or airplanes.	• Try changing the location, height and/or direction of the antenna. • If an interior antenna is being used, change to an exterior antenna. • Try using an antenna with more elements.
	Excessive noise in stereo broadcasts; sometimes no sound is emitted.	Poor location and/or direction of the antenna. Transmitting station is too far away.	
	Excessive distortion in the sound of stereo broadcasts.	Nearby building or mountain. [Multi-path distortion is being caused by the mutual interference of broadcast signals received directly from the transmitting station (direct waves) and signals being reflected from nearby buildings or mountains (reflected waves).]	
	An unusual "popping" noise is heard when automobiles pass.	Such noise is called ignition noise, and occurs while the automobile engine is running.	• Relocate the antenna and the connection wires leading to it to a place farther away from where automobiles pass.
	A strange hissing noise is produced continuously or intermittently.	Caused by the "discharge phenomenon" and the "oscillation phenomenon" of electric appliances (such as fluorescent lights, TV, small series-type motors, rectification equipment, etc.).	• Try placing this unit farther away from such equipment. • Install noise-prevention equipment on this unit or on the electric appliance.

	Problem	Probable cause(s)	Suggested remedy
While listening to AM broadcasts	**An unusual "beat" sound is heard.**	Unit is being used at the same time as the television set.	• Turn off the television set, or use this unit farther away from it.
		Interference from adjacent broadcast signal.	• By using the super treble tone control ⑰ and the treble tone control ⑱, try reducing the treble sound.
	A low-pitched "hum" sound is heard when the broadcast is tuned.	The antenna connection wires are too close to the power cord.	• Place the antenna connection wires and the power cord farther apart.
		The power supply frequency from the power cord is modulated and heard from the speakers.	• Try reversing the connection of the power cord plug. • Install a special exterior antenna.
	A strange hissing noise is produced continuously or intermittently.	Caused by the "discharge phenomenon" and the "oscillation phenomenon" of electric appliances (such as fluorescent lights, TV, small series-type motors, rectification equipment, etc.).	• Try placing this unit farther away from such equipment. • Install noise-prevention equipment on this unit or on the electric appliance.
Problems noted at all times	**No sound is heard when the power is turned on.**	The power cord plug is not completely inserted.	• Confirm that the power cord plug is connected completely.
		The power supply fuse has failed.	• Request the store where this unit was purchased, or a Service Center, to replace the fuse.
		Connections are incomplete or incorrect to the speaker systems, the tuner, the power amplifier, etc.	• Check to be sure that all connection wires are correctly connected.
		The setting of the Audio/video input selector ④ has not been completely or correctly made.	• Check to be sure that the selector is set to the correct position.
	When listening to stereo sound, the sound of the various musical instruments is not heard from its correct position.	The positive (+) and negative (−) connections of the speaker connection wires are reversed.	• Reconnect the speaker connection wires so that the positive and negative connections are correct.
	When listening to stereo sound, the left and right sounds are reversed.	The left and right connections of the speaker connection wires are reversed.	• Check the speaker connection wires and make them correctly.
		The left and right connections of the connection wires connected to other equipment are reversed.	• Check the connection wires to other equipment and make them correctly.
	A low-pitched noise ("hum" or "buzz") is heard.	The power cord or a fluorescent light, etc., is near the connection wires.	• Try separating this unit from the electric appliance as far as possible. • Reverse the connection of the power cord plug.
		The connection of the ground wire is incorrect or incomplete.	• Check to be sure that the grounding connection is correct. • If the unit is not grounded, try doing so.
	Sound is not heard from the speaker system on one side.	The speaker connection wires are disconnected.	• Check and correct the connections of the speaker connection wires.
		The balance control ⑫ is not set to the center position.	• Set the mark on the balance control to the center position.
	The volume level for a radio broadcast is different from that for disc play.	The strength of the broadcast signal is not the same as the output from the turntable.	• Adjust the volume level by using the volume control ⑦.
	While listening, sound is suddenly no longer heard. (Indication lamps of other equipment are still illuminated.)	The protection circuitry of the preamplifier has been activated.	• Check the connections to other equipment (especially the speaker connection terminals, etc.), and, if still no sound is heard, request service from the store where the unit was purchased or from your local Service Center.

BLOCK DIAGRAM



There are also Authorized Panasonic Servicenters throughout the USA which may be more conveniently located to you. For information please telephone, dial toll free, just as you would normally dial long distance to (800) 447-4700.

DIAL TOLL FREE
800-447-4700
24 Hours a Day, 7 Days a Week

Correspondence requesting products information should be sent to: Panasonic Consumer Affairs, Panasonic Company, Division of Matsushita Electric Corp of America.
1 Panasonic Way, Secaucus, N.J. 07094

If there is no Servicenter available in your area, you should carefully pack the product, preferably in the original carton, and send it postage and insurance prepaid to the most conveniently located factory Servicenter nearest you. Customer assumes all risks in shipping the product. Enclose with the product a statement concerning in which way the product is defective and the purchase receipt or other proof of purchase. MET shall assume the costs of sending the product and proof of purchase back to the customer.

Requests for assistance in obtaining repairs or technical information...contact any one of the following Service Administration offices:

EASTERN
45 Hartz Way
Secaucus, NJ 07094
201-348-7460

MIDWEST
425 East Algonquin Road
Arlington Heights, IL 60005
312-981-4842

WESTERN
6550 Katella Avenue
Cypress, CA 90630
714-895-7438

SOUTHERN
2 Meca Way
Norcross, GA 30093
404-925-6860

Service in the Continental U.S.A....Factory Servicenters

MATSUSHITA SERVICES COMPANY
50 Meadowland Parkway, Secaucus, New Jersey 07094

ALABAMA
1616 Second Avenue, South
Birmingham, AL 35233
205-252-4195

ARIZONA
2121 Priest Drive, South
Suite 107
Tempe, AZ 85282
602-968-8539

CALIFORNIA
6550 Katella Avenue
Cypress, CA 90630
714-895-7425

20201 Sherman Way
Suite 102
Canoga Park, CA 91306
213-709-1775

260 Visitacion Mall
Brisbane, CA 94005
415-467-6860

5654 E. Westover
Fresno, CA 93727
209-294-0400

2045 Saybrook Avenue
Los Angeles, CA 90040
213-726-2900

COLORADO
14401 E. 33rd Place
Suite E.
Aurora, CO 80011
303-371-6968

FLORIDA
16175 NW 52nd Avenue
Miami, FL 33014
305-624-6521

4115 W. Kennedy Boulevard
Tampa, FL 33609
813-872-2686

4101 N. Dixie Highway
Oakland Park, FL 33334
305-563-5847

208 Volusia Avenue
Daytona Beach, FL 32014
904-258-8512

GEORGIA
456 Plasamour Drive, NE
Atlanta, GA 30324
404-874-3346

2 Meca Way
Norcross, GA 30093
404-925-6880

ILLINOIS
425 E. Algonquin Road
Arlington Hgts, IL 60005
312-981-4840

9501 W. Grand Avenue
Franklin Park, IL 60131
312-451-0212

INDIANA
7025 Kensington Drive
Indianapolis, IN 46226
317-542-7730

MARYLAND
8711 Liberty Plaza Mall
Randallstown, MD 21133
301-655-0300

MASSACHUSETTS
101 University Avenue
Westwood, MA 02090
617-329-4280

MICHIGAN
1270-A Rankin Street
Troy, MI 48084
313-585-8666

MINNESOTA
7850-12th Avenue, South
Airport Business Center
Bloomington, MN 55420
612-854-8624

MISSOURI
10212 St. Charles Rock Road
St. Ann, MO 63074
314-423-1900

NEW JERSEY
45 Hartz Way
Secaucus, NJ 07094
201-348-7400

OHIO
494 Northland Boulevard
Cincinnati, OH 45240
513-851-4180

PENNSYLVANIA
8362-80 State Road
Philadelphia, PA 19136
215-332-5550

4986 Library Road, Rt. 88
Hillcrest Shopping Center
Bethel Park, PA 15102
412-343-0555

TENNESSEE
925 Eighth Avenue, South
Nashville, TN 37203
615-244-4434

TEXAS
7420 Harwin Drive
Houston, TX 77036
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Important Information — Please Read Carefully

Limited Warranty

Matsushita Electric Trading Co., Ltd. (hereinafter MET) warrants that the products listed below and which are sold through the United States Military Exchange Service located in Europe, Asia and the Pacific are free from defects in material and workmanship at the time of manufacture. This warranty is valid only from the date of the Product's original purchase for the time periods indicated below. This warranty shall not apply and MET disclaims any liability or responsibility whatsoever for any damage or defect in the product occurring in shipment or resulting from alteration, accident, misuse, abuse, neglect, faulty installation, improper maintenance by the purchaser or any third party, or for any product the serial number of which has been altered or removed.

Should such defect in material or workmanship exist in the product, MET will repair or replace such parts without charge during the warranty period at designated repair centers in U.S. Military Exchange installations located outside the United States or at Panasonic authorized service centers in the United States, also referred to as Servicenters, a list of which is on the reverse side hereof. A PURCHASE RECEIPT OR OTHER PROOF OF DATE OF ORIGINAL PURCHASE MUST BE PRESENTED before warranty performance is rendered.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR GUARANTEES EXPRESSED OR IMPLIED, OF FITNESS FOR A PARTICULAR PURPOSE, OF MERCHANTABILITY OR OTHERWISE.

Product	Carry-in only Duration of the warranty Free replacement of parts	No labor charge
Technics		
Receiver, Amplifier, Control System, Tuner, Equalizer	2 years	2 years
Turntable, Compact Disc Player, Audio Timer	2 years	2 years
Speaker	5 years	5 years
Tape Deck (Excluding Direct Drive Motor of Cassette Tape Deck)	2 years	2 years
Direct Drive Motor of Cassette Tape Deck	3 years	3 years
Digital Audio Equipment	2 years	2 years
Time Lapse Video Heads	90 days	90 days
Key Board	1 year	1 year
Panasonic		
Video Equipment	1 year	90 days
Video Camera, Camcorder: Pickup Tubes	6 months	90 days
Other Parts	1 year	90 days
Music System (Radio/Phono/Tape Deck/Speaker Combination)	1 year	1 year
Turntable	1 year	1 year
Cassette Tape Recorder/with Radio	1 year	1 year
8-Track Cartridge Tape Recorder	1 year	1 year
Radio (Including Clock Radio)	2 years	2 years
Car Stereo/with Radio	1 year	1 year
Black & White TV Receiver	1 year	1 year
Digital Color TV Receiver	2 years	2 years
Color TV Receiver/Color Monitor TV: Picture Tube	2 years	1 year
Other Parts	1 year	1 year
Electronic Calculator	1 year	1 year
Personal Computor Products	1 year	1 year
Telephone Equipment	1 year	1 year
Electronic Typewriter	90 days	90 days
Microwave Oven and Microwave/Convection Oven: Magnetron	5 years	5 years
Other Parts	1 year	1 year
Rice Cooker/Warmer, Food Processor, Juice Extractor, Toaster Oven/Broiler	1 year	1 year
Electric Fan: Motor	5 years	1 year
Other parts	1 year	1 year
Kerosene Heater, Vacuum Cleaner, Electric Iron	1 year	1 year
Hair Dryer, Shaver, Electric Massager	1 year	1 year

Note: 1. Dry cells, Styluses and Cartridges installed at the time of purchase of the product are expressly excluded from this warranty.
2. Video Cassette Tape is covered only for manufacturing defects for five (5) days after original purchase.
3. Batteries (For Battery Operated Video Products) are replaced with new batteries in exchange for original batteries which fall to operate within ten (10) days after original purchase. (Dry cells are not warranted).

Panasonic
Technics

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